AMENDMENTS TO THE CLAIMS

The listing of claims below replaces all prior versions, and listings, of claims the application.

LISTING OF CLAIMS

Claim 1. (currently amended) A device for sensing and characterizing particles by the Coulter principle, said apparatus comprising:

(a) a conduit through which a liquid suspension of particles to be sensed and characterized can be made to pass, wherein said conduit has an effective electrical impedance which is changed with the passage of each particle therethrough and wherein the conduit has a cross-sectional area of less than about 1 μm^2 and a length of less than about 10 μm;

(b) a liquid-handling[[-]]system for causing said liquid suspension of particles to pass through said conduit; and

(c) a measurement system for sensing the change of electrical impedance in said conduit.

Claim 2. (currently amended) The device of claim 1, wherein said liquid-handling [[-]]system comprises two reservoirs linked by said conduit.

Claim 3. (currently amended) A device for sensing and characterizing particles by the Coulter principle, said apparatus comprising:

(a) a conduit through which a liquid suspension of particles to be sensed and characterized can be made to pass, wherein said conduit has an effective electrical impedance which is changed with the passage of each particle therethrough and wherein the conduit has a cross-sectional area of less than about 1 μm^2 and ~~The device of claim 1, wherein the conduit has~~ a length, in the direction of the passage of the particles, of between about 0.1 and about 50 micrometers;

(b) a liquid-handling system for causing said liquid suspension of particles to pass through said conduit; and

(c) a measurement system for sensing the change of electrical impedance in said conduit.

Claim 4. (original) The device of claim 1, wherein the conduit has a length, in the direction of the passage of the particles, of between about 1 and about 10 micrometers.

Claim 5. (currently amended) The device of claim 1, further comprising a microfluidics or nanofluidics system for delivering the liquid suspension of particles to the liquid-handling system.

Claim 6. (original) The device of claim 1, wherein the surface of the conduit has been functionalized to reduce or enhance adsorption of the particles to said surface.

Claim 7. (original) The device of claim 2, wherein the surface of the reservoirs has been functionalized to reduce or enhance adsorption of the particles to said surface.

Claim 8. (original) The device of claim 1 wherein the conduit is formed at least in part by an elastomeric material.

Claim 9. (original) The device of claim 8, wherein the elastomeric material comprises polyisoprene, polybutadiene, polychloroprene, polyisobutylene, poly(styrene-butadiene-styrene), polyurethane, poly(dimethylsiloxane) or silicone.

Claim 10. (original) The device of claim 1, wherein the measurement system comprises a four-point electrode system.

Claim 11. (currently amended) A device for sensing and characterizing particles by the Coulter principle, said apparatus comprising:

(a) a conduit formed at least in part by an elastomeric material and through which a liquid suspension of particles to be sensed and characterized can be made to pass, wherein said conduit has an effective electrical impedance which is changed with the passage of each particle therethrough;

(b) a liquid-handling[[-]]system for causing said liquid suspension of particles to pass through said conduit; and

(c) a measurement system for sensing the change of electrical impedance in said conduit.

Claim 12. (currently amended) The device of claim 11, wherein said liquid-handling[[-]]system comprises two reservoirs linked by said conduit.

Claim 13. (original) The device of claim 11, wherein the conduit has a length, in the direction of the passage of the particles, of between about 1 and about 10 micrometers.

Claim 14. (original) The device of claim 11, wherein the conduit has a cross-sectional area of between about 1 μm^2 or less.

Claim 15. (original) The device of claim 11, further comprising a microfluidics or nanofluidics system for delivering the liquid suspension of particles to the liquid handling system.

Claim 16. (original) The device of claim 11, wherein the surface of the conduit has been functionalized to reduce or enhance adsorption of the particles to said surface.

Claim 17. (original) The device of claim 12, wherein the surface of the reservoirs has been functionalized to reduce or enhance adsorption of the particles to said surface.

Claim 18. (original) The device of claim 11, wherein the elastomeric material comprises polyisoprene, polybutadiene, polychloroprene, polyisobutylene, poly(styrene-butadiene-styrene), polyurethane, poly(dimethylsiloxane) or silicone.

Claim 19. (original) The device of claim 11, wherein the device is substantially transparent.

Claim 20. (original) The device of claim 19, wherein the device further comprises an optical detection system.

Claim 21. (original) The device of claim 11, wherein the measurement system comprises a four-point electrode system.

Claim 22. (original) A method for sensing and characterizing particles by the Coulter principle, said method comprising:

(a) passing a liquid suspension of particles to be sensed and characterized through a conduit formed at least in part by an elastomeric material, wherein said conduit has an effective electrical impedance which is changed with the passage of each particle therethrough; and

(b) monitoring electrical current through or voltage across, said conduit to sense the approach of particles to, the presence and characteristics of particles passing through, or the departure of particles from, said conduit.

Claim 23. (original) The method of claim 22, wherein the particle's residence time in the conduit is also measured.

Claim 24. (original) The method of claim 22, wherein the conduit has a length, in the direction of the passage of the particles, of between about 1 and about 10 micrometers.

Claim 25. (original) The method of claim 22, wherein the conduit has a cross-sectional area of less than about 1 μm^2.

Claim 26. (original) The method of claim 22, further comprising a microfluidics or nanofluidics system for delivering the liquid suspension of particles to the conduit.

Claim 27. (original) The method of claim 22, wherein the elastomeric material comprises polyisoprene, polybutadiene, polychloroprene, polyisobutylene, poly(styrene-butadiene-styrene), polyurethane, or silicone.

Claim 28. (original) The method of claim 22, wherein the sensing of the approach of particles to, the presence and characteristics of particles passing through, or the departure of particles from, said conduit, initiates additional measurements or actions on said particles.

Claim 29. (original) A method for sensing and characterizing particles by the Coulter principle, said method comprising:

(a) passing a liquid suspension of particles to be sensed and characterized through a conduit, wherein said conduit has an effective electrical impedance which is changed with the passage of each particle therethrough and wherein the conduit

has a cross-sectional area of less than about 1 μm^2 and a length of less than about 50 μm; and

(b) monitoring electrical current through or voltage across, said conduit to sense the approach of particles to, the presence and characteristics of particles passing through, or the departure of particles from, said conduit.

Claim 30. (original) The method of claim 29, wherein the particle's residence time in the conduit is also measured.

Claim 31. (original) The method of claim 29, further comprising a microfluidics or nanofluidics system for delivering the liquid suspension of particles to the conduit.

Claim 32. (original) The method of claim 29, wherein the conduit is formed at least in part by an elastomeric material.

Claim 33. (original) The method of claim 32, wherein the elastomeric material comprises polyisoprene, polybutadiene, polychloroprene, polyisobutylene, poly(styrene-butadiene-styrene), polyurethane, or silicone.

Claim 34. (original) The method of claim 29, wherein the conduit is substantially transparent.

Claim 35. (original) The method of claim 34, further comprising the step of optically detecting the particles as the particles pass through said conduit.

Claim 36. (original) The method of claim 29, wherein the electrical current and voltage are measured using a four-point electrode system.

Claim 37. (original) The method of claim 29, wherein the sensing of the approach of particles to, the presence and characteristics of particles passing through, or the departure of particles from, said conduit, initiates additional measurements or actions on said particles.

Claim 38. (withdrawn) A method for fabricating a microchip Coulter counter comprising the steps of:

(ii) providing a substrate having a plurality of electrodes; and

(ii) fluidly sealing an elastomeric cap on the top surface of the substrate and over at least two of said plurality of electrodes,

whereby a conduit and two reservoirs are formed,

wherein said conduit has an effective electrical impedance which is changed with the passage of a particle therethrough.

AMENDMENTS TO THE DRAWINGS

Figures 1, 2, 3 and 5 have been corrected so as not to be overly dark or unclear. These sheets, which include Replacement Sheets for Figures 1, 2, 3, and 5, replace the original drawings.